APPENDIX NOT INCLUDED

Amended Record of Decision

Sheridan Disposal Services Site
Waller County, Texas

CERCLIS # TXD 062132147

December 2002

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
SUPERFUND DIVISION

919192

Declaration for the Amended Record of Decision

Site Name and Location

Sheridan Disposal Services Superfund Site
Waller County, Texas
CERCLIS ID# TXD062132147

Statement of Basis and Purpose

This decision document presents the amended remedial action for the Source Control Operable Unit ("OU 1") of the Sheridan Disposal Services Site ("Site") in Waller County, Texas. The remedial action is being amended in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), 42 U.S.C. §9601 et seq., as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300.

This decision was based on the Administrative Record, which has been developed in accordance with Section 113 (k) of CERCLA, and which is available for review at the Waller County Library in Hempstead, Texas, the U.S. Environmental Protection Agency ("EPA") in Dallas, Texas, and the Texas Commission on Environmental Quality ("TCEQ") in Austin, Texas. The selected remedy was proposed for public comment on April 8, 2002. A formal public meeting was held on April 16, 2002. The amended remedy presented in this document has been selected based upon review and consideration of public comment and the documents listed in the entire Administrative Record Index (Appendix C to the Amended ROD).

The State of Texas concurs with this ROD Amendment.

Assessment of the Site

The response action selected in this Amended ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Description of the Remedy

The ROD for OU 1 of the Sheridan Disposal Services site was signed by EPA on December 29, 1988. The 1988 ROD for OU 1 identified biotreatment of approximately 44,000 cubic yards of waste, followed by stabilization and capping of the bioresidue. Wastes contained in a 12-acre

lagoon are considered a principal threat based on its potential to migrate to ground water and surface water and the high concentrations of toxic compounds identified in the lagoon sludge. A separate ROD for the ground water operable unit ("OU 2") was signed by EPA on September 29, 1989.

The major components of the amended remedy for the source control operable unit include:

- In-situ stabilization/solidification of an estimated 44,000 cubic yards of waste containing greater than 25 ppm polychlorinated biphyenyls ("PCBs");

- Determination of a site-specific unconfined compressive strength performance standard to measure how well the stabilized material will hold up under mechanical stresses created by over-burden and earth-moving equipment;

- Disposal of oversized materials (demolition scrap and equipment, crushed drums, etc.) with stabilized material and underneath the final cap; and

- Setting performance standards for leachate concentrations from treated wastes. Contaminant concentrations in leachate extracted from the treated waste (following a 28 day curing period) using the Synthetic Precipitation Leaching Procedure ("SPLP"), cannot exceed leachate levels determined to be protective of human health and the environment in the Brazos River. The protective leachate concentrations are presented in Table EA-2 of the *Evaluation of Leachate Performance Standards," July 1999.*

The remaining components for OU 1 identified in the 1988 ROD remain unchanged as follows:

- Installation a RCRA-compliant cap over the entire lagoon and dike area;

- Installation of a flexible spur jetty river bank erosion control system in the Brazos River (installed in 1992);

- Monitoring ground water quality for a minimum of 30 years;

- Decontamination, disassembly and proper disposal of all on-site tanks and processing equipment;

- Proper disposal of any drums encountered during remediation. Contents of intact drums will be treated on-site or disposed of off-site, depending on the nature of the material;

- Treatment of potentially contaminated storm-water and waste-water streams resulting from the waste treatment alternatives, to remove solids, metal, and organic constituents. The treated water will comply with all Federal/ State standards for discharge into the Brazos River; and

- Implementation of institutional controls to prevent use of contaminated ground water and ensure the long-term integrity of the cap. (Deed notices have been filed which implement this institutional control)

Statutory Determinations

The amended remedy for the source control operable unit is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. This amended remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because the remedy will result in hazardous substances remaining on-site above health-based concentration levels, a statutory review will be conducted within five years of commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

ROD Data Certification Checklist

The following information is included in the Decision Summary section of this Record of Decision or in the 1988 ROD. Additional information can be found in the Administrative Record file for this site.

- Chemicals of concern ("COCs") and their respective concentrations
- Baseline risk represented by the COCs is presented in the 1988 ROD
- How source materials constituting principal threats are addressed
- Cleanup levels established for COCs and the basis for the levels are presented in the 1988 ROD
- Current and future land and ground water use assumptions used in the baseline risk assessment are presented in the 1988 ROD
- Land and ground water use that will be available at the site as a result of the selected remedy

- ✔ Estimated capital, operation and maintenance ("O&M"), and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected
- ✔ Decisive factor(s) that led to selecting the amended remedy

Authorizing Signatures

This ROD Amendment documents the selected remedy for the Source Control Operable Unit at the Sheridan Disposal Services Superfund Site. This remedy was selected by EPA with concurrence of the Texas Commission on Environmental Quality.

W K Honker — 12/4/02

Myron O. Knudson, Director — Date
Superfund Division
U.S. EPA Region 6

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Table of Contents

List of Figures

List of Figures

List of Appendices

ACRONYMS

ACL	Alternate Concentration Limits
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CWA	Clean Water Act
ELPS	Evaluation of Leachate Performance Standards
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	Operation and Maintenance
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RTRP	Remedial Technology Review Program
SARA	Superfund Amendments and Reauthorization Act of 1986
SPLP	Synthetic Precipitation Leaching Procedure
SSS	Supplemental Stabilization Study
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
UCS	Unconfined Compressive Strength
VOC	Volatile Organic Compound

SECTION 1
Introduction and Statement of Purpose

This document amends the Sheridan Disposal Services Record of Decision ("ROD") issued on December 29, 1988, for the Source Control Operable Unit ("OU 1"). The Sheridan Disposal Services Site (CERCLIS ID# TXD062132147) is located approximately nine miles north-northwest of the City of Hempstead, Waller County, Texas (Figure 1-1). The Environmental Protection Agency ("EPA") is revising the original remedy by eliminating the biotreatment of site wastes prior to stabilization and capping. The basis for the change is summarized below. All other components of the 1988 ROD are retained. In amending the 1988 ROD, EPA has followed the procedures set forth in Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), 42 U.S.C. § 9617, and in Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. §300.435(c)(2)(ii).

EPA is the lead agency for Site activities and is issuing this ROD Amendment. The Texas Commission on Environmental Quality (TCEQ) [formerly the Texas Natural Resource Conservation Commission) is the support agency and provided technical assistance to EPA.

The Consent Decree for the Source Control Operable Unit was lodged with the United States District Court in 1991 and incorporated the December 1988 ROD that selected ex-situ bioremediation followed by stabilization. However, the Consent Decree was not entered by the Court until October 1997. When the Consent Decree was entered, it was agreed that the first task in the Remedial Design was to conduct the Remedial Technology Review Program (*Remedial Technology Review Program (RTRP), 1998*). As nearly ten years had elapsed since the original remedy evaluation and selection process, the responsible parties, with EPA oversight, initiated the RTRP to identify whether advances in remedial technologies over the previous decade might provide an alternative remedy of at least equal protection to human health and the environment. The RTRP concluded that stabilization should be the remedy of choice for the site. In response to Agency comments on the RTRP report, an evaluation (*Evaluation of Leachate Performance Standards", July 1999*) was conducted that modeled the transport of leachate from both stabilized and unstabilized sludge to the Brazos River. The transport modeling effort demonstrated that no adverse impacts would result in the Brazos River as a consequence of stabilized materials that remain onsite. An additional study (*Sheridan Site Sludge Stabilization Bench-Scale Treatability Study Final Report", Volume 1, February 2001*) was conducted that evaluated several stabilizing reagents. This study concluded that commonly available stabilization reagents could effectively stabilize the Site's contaminated materials. Although bioremediation followed by stabilization and capping was determined to be the most cost-effective and protective remedy in the 1988 ROD, it was not the least expensive alternative and required a longer time frame to complete the remedy.

The decision to eliminate the biotreatment of site waste is based on new information submitted by the responsible parties and included the following considerations: 1) the biotreatment portion of the remedial action was never initiated, 2) the original remedy included a stabilization and capping component, 3) bioremediation would not remove polychlorinated biphenyls, and 4) advances in remedial technologies provide an alternate remedy (without the use of bioremediation) that is of at least equal protection to human health and the environment.

This ROD Amendment will become part of the administrative record prepared by EPA for this site, in accordance with 40 C.F.R. § 300.825(a)(2) of the NCP. The Administrative Record for the Sheridan Disposal Service site is available for review at the following information repository locations:

U.S. Environmental Protection Agency, Region 6
7th Floor Reception Area
1445 Ross Avenue
Dallas, Texas 75202-2733
(214) 665-6548
Monday through Friday 7:30 a.m. to 4:30 p.m.

Waller County Library, Hempstead, Texas
2331 11th St
Hempstead, TX 77445-6799
(979) 826-7658

Texas Commission on Environmental Quality
Records Management Center
12100 Park 35 Circle
Building E, First Floor
Austin, Texas 78753
(512) 239-2920
Monday through Friday 8:00 a.m. to 5:00 p.m.

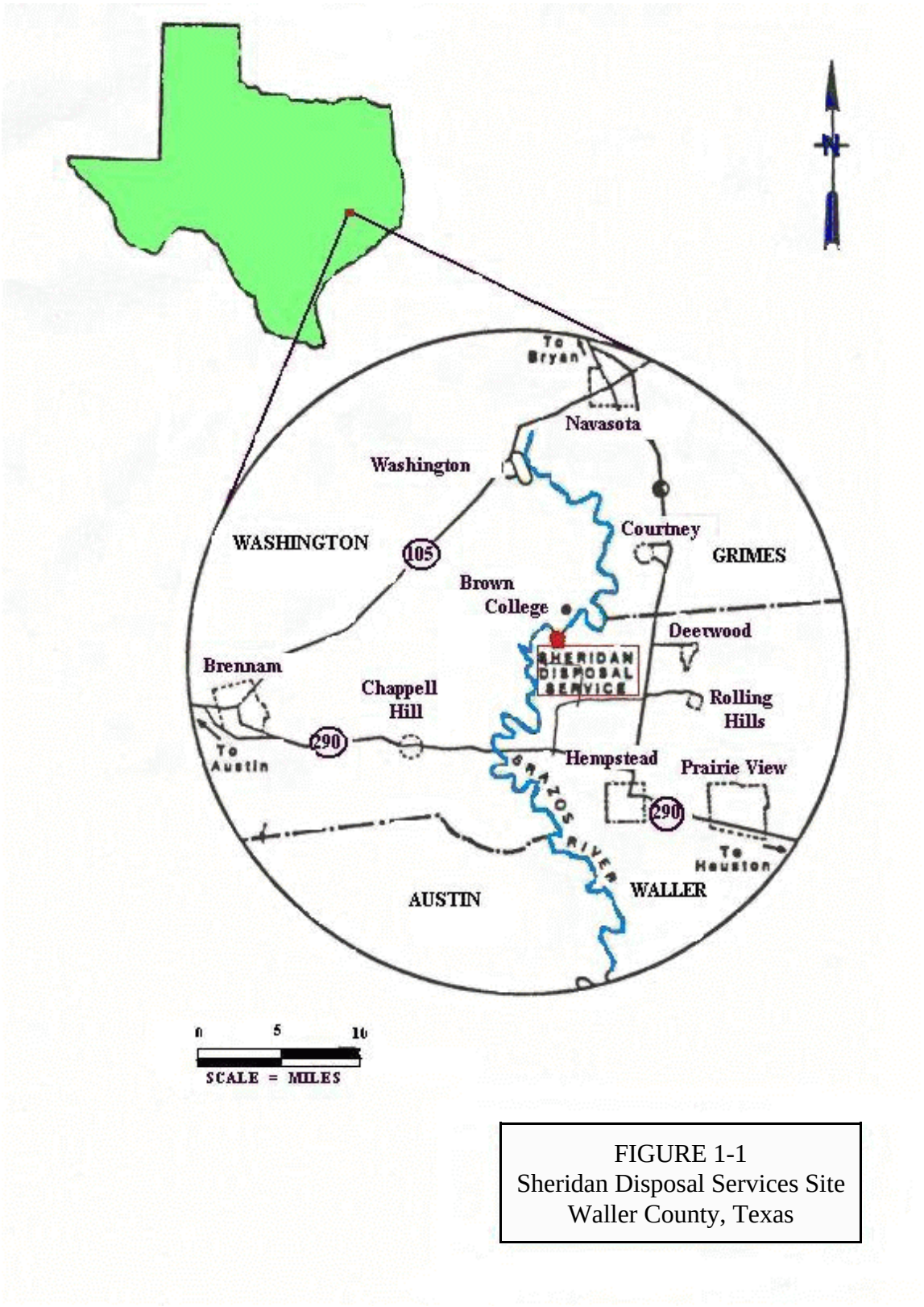

FIGURE 1-1
Sheridan Disposal Services Site
Waller County, Texas

SECTION 2
Site History, Contamination and Selected Remedy

Site History

The Site, which is approximately 110 acres, consists of a lagoon (12-22 acres depending on water levels within the lagoon) surrounded by a dike (approximately 17 acres), and a 42 acre evaporation system (Figure 2-1). The predominant land use within a four-mile radius of the site is agriculture and range land. The only residential area within this four mile radius is the community of Brown College which consists of approximately 20 residences and is located one and one half miles north of the site. Nearby communities primarily utilize ground water from the Evangeline aquifer to meet their water supply needs.

Sheridan Disposal Services operated as a commercial waste disposal facility from about 1958 to 1984. A wide variety of organic and inorganic chemical and solid wastes were disposed of at the site. The facility treated waste by steam distillation, open burning and incineration. The lagoon was developed as a holding pond for the disposal of overflow wastes and waste treatment residues. In 1976, the facility initiated use of the evaporation system for disposal of water which accumulated on the lagoon.

Site Contamination

Sampling was conducted during the Remedial Investigation ("RI") to identify types, levels and extent of contamination in sludge, soil, sediment, surface water, ground water and air. A detailed description of this information may be found in the site RI/FS and Risk Assessment.

Soil and Sludge

Sludges in the lagoon range in thickness from about six inches to three feet. The highest levels of contaminants detected at the site were found in the lagoon sludge. The most significant classes of compounds of concern ("COCs) found in the lagoon sludge in terms of concentration and toxicity include volatile organic compounds ("VOCs") and polychlorinated biphenyls ("PCBs"). The highest concentrations of benzene and toluene (two VOCs) detected are 2,500 ppm and 36,600 ppm, respectively. The highest concentration of PCBs found at the site is 223 ppm. High levels of base neutral compounds such as napthalene and phenols were also detected in the lagoon sludge. Of the metals present, zinc was found at the highest levels (13,800 ppm).

The majority of the contamination identified in the evaporation system is found in isolated sludge deposits near the point of discharge from the lagoon to the evaporation system. Contaminants in the evaporation system sludge are similar to those in the lagoon but at lower concentrations. The remainder of the evaporation and land irrigation system soils are generally characteristic of local background soils.

Sampling of the dike indicates that it contains a layer of affected soils and sludge at about three feet below the surface. Concentrations of contaminants of concern in this layer are generally at least ten times less concentrated than those found in the lagoon. Surface contamination is also visible on the dike. This contamination is most pervasive in the tank and incinerator area of the dike. The extent of this contamination on the dike was not determined during the RI/FS; however, confirmatory sampling during remedy implementation will verify that all contamination above the action level (25 ppm PCB cleanup level) is addressed by the remedial action.

The estimated waste volumes to be remediated are as follows:

Waste Area	Waste Volume
Pond Sludge	30,000 yd^3
Affected Soil Under Pond	10,000 yd^3
Evaporation System Sludge	1,000 yd^3
Oily-Dike Surface Soil	3,000 yd^3
Floating Oil & Emulsion	300 yd^3

Surface Water

Water sampling of the Brazos River downstream and upstream of the site indicated that there was no measurable difference between the downstream and upstream samples, indicating that the site had not impacted surface water. Sediment samples from the river bottom up and downstream of the site indicated that organic constituents had not impacted the sediments. Analyses of Clark Lake water and sediments did not exhibit elevated levels of site contaminants.

Ground Water

Over thirty wells have been installed at the site in both the shallow and deep aquifers to determine the extent of contamination and evaluate site hydrogeology. No contamination has been detected in the deep aquifer. The only group of contaminants identified in the shallow ground water (i.e., shallow aquifer) are VOCs. The highest concentration detected during the 1988 sampling event was for benzene, at 0.027 ppm. The remedial action for ground water is presented in the September 1989 ROD for the Ground Water Migration Management OU (OU 2) and is not modified by this ROD Amendment. However, the amended remedy for the Source Control OU (OU1) addresses the source of contamination to ground water.

December 29, 1988 Record of Decision

In the 1988 ROD, EPA decided that onsite biotreatment of wastes best satisfied both the statutory and selection criteria in comparison to the other alternatives evaluated. As stated in the 1988 ROD, biotreatment would significantly reduce waste mobility, toxicity and volume and essentially eliminate the leaching of contaminants to ground water. Further, biotreatment would result in the destruction of all mobile organics which could migrate into the environment if the containment system were to fail. It was considered the least costly alternative which would attain these goals.

It was concluded that if biotreatment could reduce the level of PCBs in the residuals to less than 50 ppm, the residuals would be stabilized, returned to the lagoon and capped. If the concentration of PCBs in the biotreated residuals were greater than 50 ppm, they would be stabilized and returned to a RCRA-compliant landfill in the lagoon area. Wastes requiring remediation by Biotreatment were defined as the following:

1. All material containing greater than 25 ppm of PCBs. This material includes the sludges contained in the lagoon and evaporation system;

2. Floating oil and emulsion in the lagoon and in on-site storage tanks;

3. Affected soil under lagoon, defined as soil that is intermixed with sludge or contains greater than 25 ppm of PCBs;

4. Dike surface soils, including: a) oily soil on the inside dike slope between the current sludge level to the highest level the floating oil layer has contacted, and b) grossly contaminated soil and sludge deposits visible on the dike. At a minimum, this includes the soil and sludge in the vicinity of the treatment tanks and incinerator in the north-northeastern portions of the dike.

5. The wastes described in items 1-4 above address all wastes containing over 25 ppm of PCBs and/or high concentrations of other organics such as benzene and phenol.

In addition to treating the wastes described above by Biotreatment, the remedy would also include the implementation of the common elements for all possible alternatives. The common elements that are described in Section 4.2. of the 1988 ROD and section 5.2 of the Source Control Feasibility Study include:

1. Install a RCRA-compliant cap over the entire lagoon and dike area.

2. Install a flexible spur jetty river bank erosion control system in the Brazos River (installed in 1992).

3. Monitor ground water quality for a minimum of 30 years.

4. Decontaminate, disassemble and properly dispose of all on-site tanks and processing equipment.

5. Properly dispose of any drums encountered during remediation, with contents of intact drums to be treated on-site or disposed of off-site, depending on the nature of the material.

6. Treat potentially contaminated storm-water and waste-water streams resulting from the waste treatment alternatives, to remove solids, metal, and organic constituents. The treated water must comply with all Federal/State standards for discharge into the Brazos River.

7. Implement institutional controls to preclude use of contaminated ground water and ensure the long-term integrity of the cap.

Consideration of Stabilization without Biotreatment in the 1988 ROD

Stabilization without Biotreatment was one of the remedial alternatives evaluated in the Feasibility Study and considered in the 1988 ROD, which discussed treatability testing at the time as follows:

> While generally available information will give an indication of the potential applicability of a given remedial technology, performance of actual laboratory tests using site-specific materials is often a better method for determining the appropriateness of a remedial technology. For this reason, treatability studies were performed at the Sheridan site. The Sheridan Site Committee elected to undertake studies to evaluate the applicability of Biotreatment, Solvent Extraction and Stabilization technologies to treat site wastes. The results of these studies are presented in Appendices B, C and D of the FS and summarized below.
>
> The Sheridan Site Committee conducted stabilization tests on samples of sludge obtained from the lagoon. Sludge was stabilized by Committee consultants using fly ash and samples were also sent to two stabilization vendors, Enreco and Soliditech for stabilization using their proprietary methods. Fly ash alone was not found to result in a stabilized waste with sufficient structural strength to support earth moving equipment during the construction of a cap.
>
> The proprietary methods improved compressive strength characteristics but leaching tests of the stabilized wastes indicated significant levels of volatile organic compounds such as benzene in the leachate. The Site Committee has also conducted additional stabilization testing which will be discussed in the Responsiveness Summary. 1988 ROD, p.5.

Stabilization technologies evaluated by the Sheridan Site Committee in 1988 were incapable of immobilizing the volatile organic compounds found in contaminated soil and sludge. In contrast, biotreatment studies conducted for the Feasibility Study found as follows:

> Sampling of the reactors was conducted after 71 days and semiquantitative mass balances were conducted to evaluate the amount of contaminant removal which occurred. This analysis indicated that essentially all the volatile organics present in the sludge were removed and at least 84% of the semi-volatile organics were degraded. The amount of organic reduction due to volatilization was not determined in the studies. The PCB removal results were less clear due to high PCB detection levels and variable original PCB content of the sludge, but they suggested that some PCB reduction had occurred. 1988 ROD, p.5.

Evaluating stabilization and biotreatment technologies for this site in 1988, EPA found that both approaches would be protective of human health and would attain ARARs. Given the limitations of stabilization technologies at the time, biotreatment was determined to be the superior alternative because it would destroy most of the organic contaminants and reduce mobility and overall waste volume (1988 ROD, p.13). Stabilization reduced contaminant mobility to a degree, but did not significantly reduce toxicity and increased overall waste volume. The 1988 Feasibility Study focused primarily on comparing the effectiveness of the source material treatment technologies. The Risk Assessment for the site found that the only potentially significant exposure pathway was migration of site contaminants into the Brazos River. This exposure pathway was modeled using very conservative assumptions (1988 ROD, p.6).

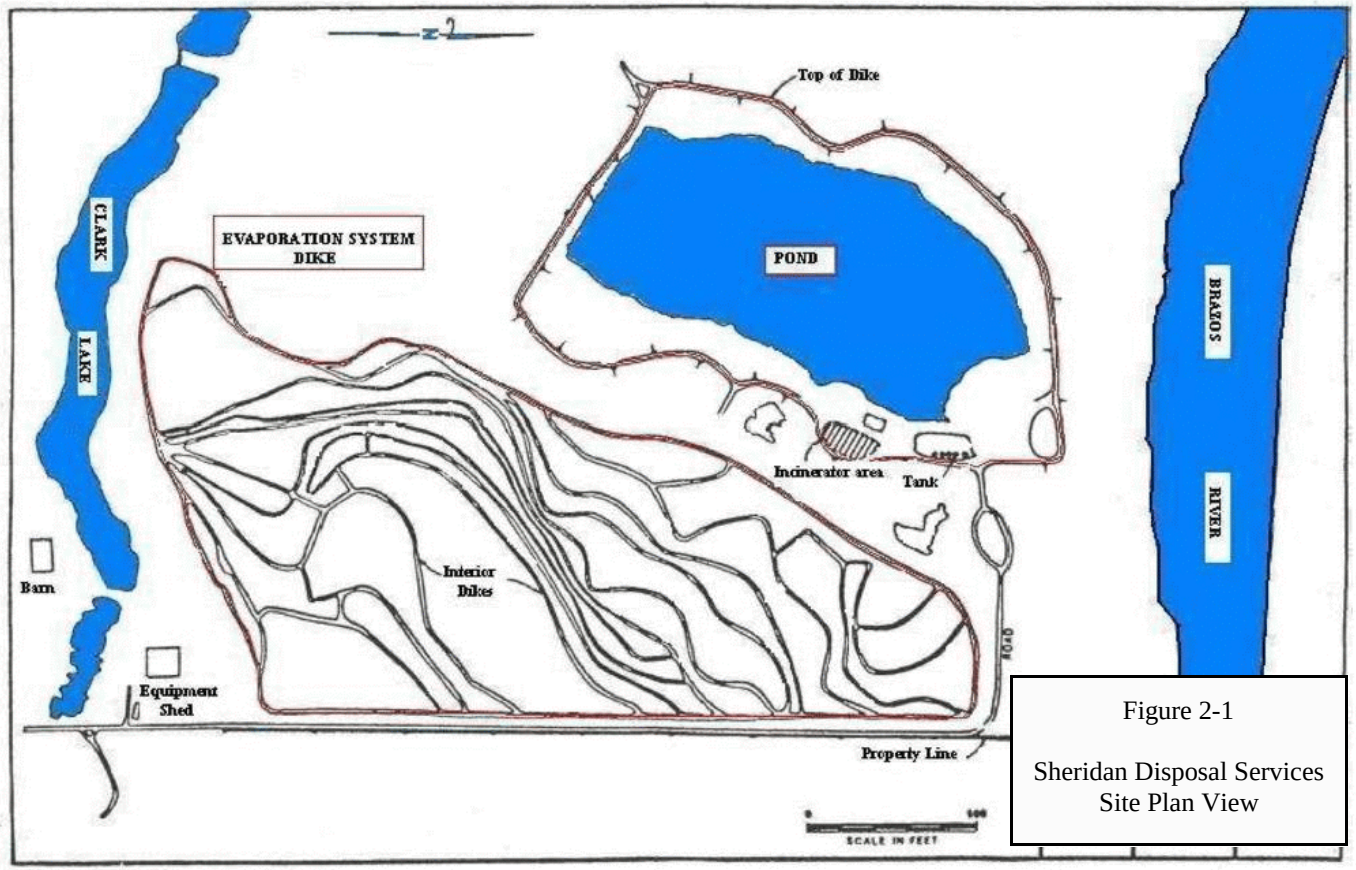

Figure 2-1

Sheridan Disposal Services
Site Plan View

SECTION 3
Basis for ROD Amendment

The objectives for remediation of the source control operable unit are to reduce the risks associated with exposure to contaminated material (e.g., soil/sediment/sludge) and address the ongoing source of contamination to ground water by treating onsite wastes and soils. The Consent Decree for the Source Control Operable Unit was lodged with the Court in 1991 and incorporated the December 1988 ROD; however, the Consent Decree was not entered by the Court until October 1997.

Since nearly ten years had elapsed since the original remedy evaluation and selection process, the responsible parties, with EPA oversight, initiated the Remedial Technology Review Program ("RTRP") to identify whether advances in remedial technologies over the previous decade might provide an alternative remedy of at least equal protection to human health and the environment. A study (*Remedial Technology Review Program (RTRP), 1998*) was conducted to identify whether advances in remedial technologies might provide an alternate remedy of at least equal protection to human health and the environment. The RTRP suggested that stabilization should be the remedy of choice for the site, in part because of the improvement in stabilization reagents to immobilize site contaminants since stabilization was evaluated in the 1988 ROD. In response to Agency comments on the RTRP report, an evaluation (*Evaluation of Leachate Performance Standards", July 1999*) was conducted that modeled the transport of leachate from both stabilized and unstabilized sludge to the Brazos River. The transport modeling effort demonstrated that no adverse impacts would result in the Brazos River as a consequence of stabilized materials that remain onsite. An additional study (*Sheridan Site Sludge Stabilization Bench-Scale Treatability Study Final Report", Volume 1, February 2001*) was conducted that evaluated several stabilizing reagents. This study concluded that commonly available stabilization reagents could effectively stabilize the Site's contaminated materials. Additional information about each of the studies is provided below.

Remedial Technology Review Program (RTRP)

Major objectives of the RTRP were as follows:

- Identify and evaluate remedial alternatives that are capable of meeting the remedial objectives in the 1988 ROD and compare the alternatives to the biotreatment alternative;
- If remedial alternatives are identified that are capable of meeting the remedial objectives in the ROD and are as protective, but more cost effective, conduct further research and laboratory treatability testing.

An initial screening of technologies was the first part of the RTRP. The technologies screened included sludge thermal desorption, stabilization/solidification, landfarming, solid-

phase biotreatment, in-situ aqueous phase biotreatment and ex-situ aqueous phase biotreatment. Following a meeting in February 1997 to evaluate technologies, two potential technologies were selected for further treatability testing. These technologies were stabilization/solidification, and solid-phase biotreatment land farming.

Stabilization/solidification was evaluated as a remedy in the 1988 Source Control OU ROD, but due to the high organic content of the sludge, and a concern that all contaminants would not be effectively immobilized, stabilization/solidification was not selected as the Source Control OU remedy. However, since 1988, high organic content sludge stabilization technology and techniques have improved. There are stabilization agents that are specifically designed to bind with organic contaminants. These agents are used in combination with Portland cement to specifically reduce organics' leachability. Also, new adsorptive stabilization reagents have been specifically developed to entrap or immobilize certain types of organic constituents. In addition, EPA Region 6 has successfully implemented the use of solidification/stabilization of sludge containing organic compounds as a remedy at two Superfund sites, the Sand Springs Petrochemical Complex and South 8th Street Landfill Superfund Sites.

Results of the stabilization/solidification treatability study indicated that several reagents were successful in greatly improving the physical characteristics of the site sludge including significant reduction in permeability, increased physical strength and reduction in leachate concentrations. Stabilization/solidification involves the least material handling and can be accomplished in the shortest time and is cost effective.

The solid phase biotreatment land farming treatability study indicated that the VOC content was significantly reduced. It was determined that the VOCs in the sludge were probably removed by volatilization. The bioresidue from the land farming activity still required solidification/stabilization for placement back in the Sheridan pond. While the biotreatment was somewhat successful, the amount of time and material handling required and the low sludge/soil ratio provided a much less efficient method of remediation than solidification/stabilization. In particular, the increased volume which must be stabilized when compared with straight stabilization of sludge provided a marked difference in implementability and cost effectiveness.

In a comparison with land farming and the remedy selected in the original ROD, straight stabilization of the sludge was evaluated to be very similar in the threshold criteria and modifying criteria. In the balancing criteria, stabilization was the highest ranked technology. Therefore, the 1998 RTRP report concluded that stabilization should be considered as the remedy of choice for the Sheridan site.

Evaluation of Leachate Performance Standards

A remedial action objective for the Source Control OU is to address the source of contamination to ground water. Low levels of contaminants are present in the shallow ground water zone at the site. The shallow ground water zone ultimately discharges to the Brazos River.

As discussed in the 1989 Ground Water OU ROD, maximum contaminant levels ("MCLs") are not applicable to the shallow ground water at the site because the Brazos River acts as a hydraulic barrier for site water. If hydrogeologic conditions change significantly at the site and contaminated ground water no longer discharges to the Brazos River, then MCLs would be ARARs. Although the MCLs are not applicable, the shallow ground water needs to be protected to levels that will be protective of human health and the environment. Since the only receptor for the shallow ground water is the Brazos River, the selected remedy needs to ensure that the ground water discharge will not have an adverse impact on human or aquatic receptors in the Brazos River. The 1989 Ground Water OU ROD established Alternate Concentration Limits ("ACLs") as the ground water protection standard. ACLs are ground water protection standards that are used to assure that hazardous constituents found in the ground water do not pose a risk to human health or the environment. In addition, ground water use restrictions discussed in the 1989 Ground Water OU ROD have been implemented to ensure that contaminated ground water is not consumed and the integrity of the Brazos River as a hydraulic barrier to ground water flow is maintained.

During EPA's review of the RTRP, the Agency noted that there was very little difference in concentrations of site contaminants in leachate from stabilized sludge material when compared with concentrations of contaminants in leachate from untreated sludge. Leachate concentrations were measured by the synthetic precipitation leaching procedure ("SPLP").

In response to EPA's observation concerning the levels of contaminants in leachate from treated and untreated sludge in the RTRP, the responsible parties conducted an Evaluation of Leachate Performance Standards ("ELPS"). The ELPS changed the focus of the Sheridan Site Committee's inquiry from the relative efficacy of soil and sludge treatment technologies to the level of protection to be achieved by the source control response action in order to meet the ACLs established in the 1989 Groundwater ROD. The ELPS provided more extensive modeling of the transport of leachate from both stabilized and unstabilized sludges to the Brazos River. Comparison of modeled concentrations in the river with target surface water criteria is presented in Table 3-1. Results of modeling demonstrated that SPLP leachate concentrations from the untreated sludge is at least an order of magnitude more protective than required to maintain safe levels in the Brazos. Therefore, when compared to the leachate from the unstabilized sludge, it is apparent that leachate from stabilized sludge does not present a health risk at the Brazos River.

Supplemental Stabilization Study

After reviewing the RTRP, and determining that a stabilization remedy would be protective of human health and the environment, it still remained to demonstrate that a stabilization reagent mixture could be developed that would exceed the unconfined compressive strength ("UCS") results reported in the 1998 RTRP. Therefore, a study, *"Sheridan Site Sludge Stabilization Bench-Scale Treatability Study Final Report" (February, 2001),* was conducted to determine the resultant UCS and the most appropriate stabilization mixture.

For the Supplemental Stabilization Study ("SSS"), a UCS performance standard was calculated that would be equal to or greater than that used for full-scale remediation activities. The UCS performance standard for the SSS was determined to be 18.4 lbs/in^2.

Preliminary stabilization evaluations were conducted to identify potential reagents and reagent formulations capable of achieving the site specific performance criterion, i.e., reagent designs capable of stabilizing and solidifying the untreated material to achieve the previously calculated UCS performance criteria of 18.4 lbs/in^2. Tests revealed that several reagents were capable of achieving the calculated and conservative UCS performance criterion of 18.4 lbs/in^2. The results for four stabilization mixtures and the corresponding UCS after 28 days are as follows:

Reagent Type	Addition Rate (%)	UCS Value (lbs/in^2)
Quicklime	30	11.1
Cement/Fly Ash	15/30	23.0
(Site Clay/Lime)/Cement	(20/2)/15	19.4
Site Clay	600	30.9

Comparing this data to results from the prior optimization tests revealed some variability in the results of UCS testing performed on material treated with a 30% addition of quicklime. Specifically, during the optimization phase of testing, a 30% quicklime addition resulted in a UCS of 30.7 lbs/in^2. However, testing during the verification phase using a 30% addition of quicklime, resulted in a UCS value of 11.1 lbs/in^2. The variability observed during treatability testing is common for bench-scale treatment using quicklime.

Experience indicates that much of the strength obtained through treatment with quicklime is developed along with relatively high heat-of-hydration values. Quicklime has a very exothermic hydration reaction which can develop significant heat. However, laboratory testing, which uses relatively small volumes of site material, can dissipate this heat very quickly. As a result, treatment in the laboratory often shows significant variability in the amount of heat developed during treatment with quicklime. It is likely that the two UCS values achieved using quicklime (11.1 and 30.7 lbs/in^2) represent relatively high and low values. Actual strength values during full-scale remediation would more commonly fall between these two values.

SPLP analyses were performed on the final mixtures to determine if the concentrations were below protective values, and to evaluate if there is a reduction in leachability between untreated sludge and treated sludge. Results from SPLP testing verified that leachate concentrations were not elevated above protective levels. In addition, the SPLP results for all treated sludge mixtures were significantly lower than SPLP values reported for both untreated and treated sludge from

the RTRP. The SPLP analyses presented in Table 3-2 confirm that SPLP values for all treated sludge mixtures are protective of human health and the environment.

The three reports, (RTRP, ELPS, and SSS) provide sufficient new information developed after the issuance of the 1988 ROD to support amending the selected remedy from biological treatment followed by stabilization and capping to stabilization and capping.

TABLE 3-1

Comparison of Leachate Concentrations From Untreated Sludge with Target Concentrations in Surface Water

CONSTITUENT	Leachate Concentration (mg/l)	Modeled Constituent Concentration of Untreated Sludge in Surface Water (mg/l)		Target Concentration in Surface Water (mg/l)	
	Untreated Sludge	Aquatic Life-Based Criteria	Human-Based Criteria	Protection of Aquatic Receptors	Protection of Human Receptors
Acetone	3.0	4.99E-04	5.22E-05	415	3.65
Benzene	7.2	1.20E-03	1.25E-04	2.3	0.005
2-Butanone	9.0	1.50E-03	1.57E-04	250	4.411
Chlorobenzene	0.32	5.32E-05	5.57E-06	19	1.305
1,2-Dichloropropane	0.24	3.99E-05	4.17E-06	16	3.1
Ethylbenzene	1.4	2.33E-04	2.43E-05	1.6	3.1
2-Hexanone	0.15	2.50E-05	2.61E-06	0.099	None
4-Methyl-2-pentanone	11.0	1.83E-03	1.91E-04	23	2.92
Styrene	1.3	2.16E-04	2.26E-05	1.25	7.3
Tetrachloroethene	0.085	1.41E-05	1.48E-06	0.9	0.005
Toluene	6.4	1.06E-03	1.11E-04	2.9	6.8
Trichloroethene	0.38	6.32E-05	6.61E-06	2.75	0.005
1,2,4-Trimethylbenzene	0.15	2.50E-05	2.61E-06	0.9	36.5
Xylenes (total)	4.8	7.99E-04	8.35E-05	0.13	65.2
2,4-Dimethylphenol	8.3	1.38E-03	1.44E-04	1.5	0.54
2-Methylphenol	21.0	3.49E-03	3.65E-04	1.5	4.049
4-Methylphenol	71.0	1.18E-02	1.23E-03	2.6	4.049
Phenol	120	2.00E-02	2.09E-03	4.6	21
Aroclor 1242	0.012	2.00E-06	2.09E-07	1.4E-05	1.3E-06
Barium	0.60	9.98E-05	1.04E-05	>50	2
Chromium (trivalent)	0.13 [1]	2.16E-05	2.26E-06	0.273	0.1

[1] was not detected in untreated sludge. Value represents SPLP result in treated sludge.

Table 3-2

Comparison of Leachate Concentrations From Treated/Untreated Sludge
with Target Concentrations in Surface Water

CONSTITUENT	**Leachate Concentration in Sludge (mg/l)**					**Protective Constituent Concentration in Leachate (mg/l)**		**Target Concentration in Surface Water (mg/l)**	
	Untreated Sludge	Quicklime (30%)	Cement/Fly Ash (15%/30%)	(Site Clay / Lime)/Cement (20/2)/15)	Site Clay (600%)	Aquatic Life-Based Criteria	Human-Based Criteria	Protection of Aquatic Receptors	Protection of Human Receptors
Acetone	3.0	0.637	0.392	0.810	0.150	2.49 E+06	2.10 E+05	415	3.65
Benzene	7.2	0.014	1.5	1.7	0.100	1.38 E+04	2.88 E+02	2.3	0.005
2-Butanone (MEK)	9.0	0.230	0.650	1.0	-	1.50 E+06	2.54 E+05	250	4.411
Chlorobenzene	0.320	-	0.032	0.046	0.022	1.14 E+05	7.50 E+04	19	1.305
1,2-Dichloropropane	0.240	-	0.031	0.036	-	9.62 E+04	2.99 E+02	16	0.0052
Ethylbenzene	1.4	0.024	0.520	0.830	0.530	9.62 E+03	1.78 E+05	1.6	3.1
2-Hexanone	-	-	0.160	0.260	-	5.95 E+02	None	0.099	None
4-Methyl-2-pentanone	11.0	0.160	3.0	4.0	0.058	1.38 E+05	1.68 E+05	23	2.92
Styrene	1.3	0.041	0.570	0.840	0.440	7.51 E+03	4.20 E+05	1.25	7.3
Tetrachloroethene	0.085	-	0.030	0.048	0.031	5.41 E+03	2.88 E+02	0.9	0.005
Toluene	6.4	0.055	2.6	3.7	1.2	1.74 E+04	3.91 E+05	2.9	6.8
Trichloroethene	0.380	-	0.067	0.092	0.023	1.65 E+04	2.88 E+02	2.75	0.005
Vinyl Acetate	-	-	-	-	-	5.41 E+04	2.10 E+06	0.9	36.5
Xylenes (total)	4.8	0.236	4.04	6.2	3.980	7.81 E+02	3.75 E+06	0.13	65.2
2,4-Dimethylphenol	8.3	6.9	13	17	2.3	9.20 E+03	3.11 E+04	1.5	0.54
2-Methylphenol	21.0	8.3	12.0	13.0	2.9	9.02 E+03	2.33 E+05	1.5	4.049
4-Methylphenol	71.0	25.0	22.0	25.0	6.3	1.56 E+04	2.33 E+05	2.6	4.049
Phenol	120.0	3.3	23.0	23.0	6.8	2.76 E+04	1.21 E+06	4.6	21
Aroclor 1242	0.012	-	-	-	-	8.40 E-02	7.48 E-02	1.4E-05	1.3E-06
Barium	0.60	0.039	0.12	0.15	0.069	3.01 E+05	1.15 E+05	>50	2
Chromium (trivalent)	-	-	-	-	-	1.64 E+03	5.75 E+03	0.273	0.1

SECTION 4
Description of Alternatives

The remedial alternatives evaluated in this Amended ROD include the original remedy selected in the December 1988 Record of Decision and the new selected remedy. The new remedy is based on focused feasibility study submittals (RTRP, ELPS, and SSS), and other information in the Administrative Record.

Alternative 1 - Biotreatment (December 1988 ROD)

The December 1988 ROD selected onsite biotreatment of site wastes followed by stabilization of the bioresiduals. In addition, the stabilized bioresiduals would be returned to the lagoon and capped.

Waste requiring remediation by biotreatment was defined by the following:

1. All material containing greater than 25 ppm of PCBs. This material includes the sludges contained in the lagoon and evaporation system;

2. Floating oil and emulsion in the lagoon and in on-site storage tanks;

3. Affected soil under lagoon, defined as soil that is intermixed with sludge or contains greater than 25 ppm of PCBs;

4. Dike surface soils, including: a) oily soil on the inside dike slope between the current sludge level to the highest level the floating oil layer has contacted, and b) grossly contaminated soil and sludge deposits visible on the dike. At a minimum, this includes the soil and sludge in the vicinity of the treatment tanks and incinerator in the north-northeastern portions of the dike.

5. The wastes described in items 1-4 above address all wastes containing over 25 ppm of PCBs and/or high concentrations of other organics such as benzene and phenol.

If biotreatment could reduce the level of PCBs in the residuals to less than 50 ppm, the residuals would be stabilized, returned to the pond and capped. If the concentration of PCBs in the biotreated residuals was greater than 50 ppm, they would be stabilized and returned to a RCRA-compliant landfill in the pond area.

In addition to treating the wastes described above by Biotreatment, the remedy also included the implementation of the actions described below:

1. Install a RCRA-compliant cap over the entire lagoon and dike area.

2. Install a flexible spur jetty river bank erosion control system in the Brazos River (installed in 1992).

3. Monitor ground water quality for a minimum of 30 years.

4. Decontaminate, disassemble and properly dispose of all on-site tanks and processing equipment.

5. Properly dispose of any drums encountered during remediation, with contents of intact drums to be treated on-site or disposed of off-site, depending on the nature of the material.

6. Treat potentially contaminated storm-water and waste-water streams resulting from the waste treatment alternatives, to remove solids, metal, and organic constituents. The treated water must comply with all Federal/State standards for discharge into the Brazos River.

7. Implement institutional controls to preclude use of contaminated ground water and ensure the long-term integrity of the cap.

Total Capital Cost:	$ 23,730,000
Operation and Maintenance Costs	$ 473,000
Total Present Worth Cost	$ 24,203,000

Alternative 2 - Stabilization

This alternative for the Sheridan Disposal Services site eliminates the biotreatment step included in the 1988 ROD and requires onsite in-situ stabilization of wastes. Once the wastes are stabilized, they will be capped. The waste volume to be remediated under this alternative is the same as the waste volume described for Alternative 1. With the exception of eliminating the biotreatment step, all portions of the 1988 ROD remedy are included in the amended remedy.

In addition, the following elements will be included in the amended remedy for OU1:

- A UCS performance standard will be determined based on a site-specific stabilization vault design, including the temporary construction load;
- Oversized materials (demolition scrap and equipment, crushed drums, etc) will be placed for disposal within the stabilized material and underneath the final cap;
- Setting performance standards for leachate concentrations from treated wastes. Contaminant concentrations in leachate extracted from the treated waste (following a 28 day curing period) using the Synthetic Precipitation Leaching Procedure (SPLP), cannot exceed leachate levels determined to be protective of human health and the environment in the Brazos River. The protective leachate concentrations are presented in Table EA-2 of the ELPS.

Total Capital Cost:	$ 13,810,000
Operation and Maintenance Costs	$ 473,000
Total Present Worth Cost	$ 14,283,000

The remedial action objectives of the original ROD were to reduce the risks associated with exposure to contaminated materials and address the sources of contamination to ground water by treating onsite wastes and soils. The objectives of the new remedy are the same.

SECTION 5
Evaluation of Alternatives

The NCP requires that the alternatives be evaluated against nine evaluation criteria. This section summarizes the relative performance of the alternatives by highlighting the key differences among the alternatives in relation to these nine criteria. These nine criteria are categorized into three groups: threshold, balancing, and modifying. The threshold criteria of overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements ("ARARs") must be met in order for an alternative to be eligible for selection. The balancing criteria of long-term effectiveness and permanence, reduction of toxicity, mobility or volume through treatment; short-term effectiveness, implementability, and cost are used to weigh major tradeoffs among alternatives. The modifying criteria of State and community acceptance are taken into account after State and public comment is received on EPA's preferred alternative as identified and described in the Amended Proposed Plan of Action.

Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, and/or institutional controls.

Alternative #1: **Biotreatment** - destroys mobile organic compounds which could migrate into shallow ground water and ultimately discharge into the Brazos River. However, biotreatment does not reduce the concentration of PCBs that are contained in waste materials.

Stabilization - Biotreatment residue is stabilized to reduce the leaching potential of PCBs contained in site wastes. Reduction in leaching potential results in protection of human health and the environment in the Brazos River.

Capping of Pond and Dike Area - Capping of the biotreated and stabilized material will act as a barrier that restricts infiltration of storm water and direct contact with site waste.

Monitoring - monitoring of ground water quality would be conducted as part of the remedy for OU 2 and would ensure that the sources of contamination to ground water are addressed.

Institutional Controls - precludes use of contaminated ground water and ensures long-term integrity of the cap.

Alternative #2: **Stabilization -** Site wastes are stabilized to reduce the leaching of volatile organic compounds and PCBs. Reduction of leaching of volatile organic compounds reduces potential for impacts to the shallow ground water. Also, reduction in leaching potential results in protection of human health and the environment in the Brazos River. Stabilization also reduces the risk by converting the contaminants into a less soluble and mobile form.

Capping of Pond and Dike Area - Capping of the stabilized material will act as a barrier that restricts infiltration of storm water and direct contact with site waste.

Monitoring - monitoring of ground water quality would be conducted as part of the remedy for OU 2 and would ensure that the sources of contamination to ground water are addressed.

Institutional Controls - precludes use of contaminated ground water and ensures long-term integrity of the cap.

Both alternatives would provide overall protection of human health and the environment. Monitoring and maintenance would be implemented to assure long-term protection.

Compliance With Applicable or Relevant and Appropriate Requirements (ARARs)

Compliance with ARARs addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and/or provide grounds for invoking a waiver.

Alternative #1: The ARARs for the original remedy are presented in Appendix A of the 1988 ROD.

Alternative #2: Since the amended remedy has many of the same components as the original ROD remedy, the amended remedy will also comply with the ARARs. Removal of biotreatment does not affect compliance with ARARs because biotreatment was not required to comply with the closure and post-closure requirements under RCRA Subpart K (40 CFR §264.228). A key ARAR that applies upon completion of the remedy is the surface impoundment closure requirements under the Resource Conservation and Recovery Act. The amended remedy does not include off-site disposal of the treated sludge. The

contents of any intact drums encountered during remediation will be treated onsite or disposed of offsite depending on the nature of the material. If the drum material is sent off-site, ARARs associated with off-site disposal will apply.

Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

Alternative #1: **Biotreatment** - The original remedy achieves long-term effectiveness through destruction of the organic compounds by biotreatment. In addition, the mobility of the PCBs would be reduced since the more mobile volatile constituents would be removed.

Stabilization - The mobility of the PCBs would be reduced through stabilization of the biotreatment residue.

Capping of Pond and Dike Area - Capping of the pond and dike area would maintain reliable protection of human health and the environment by restricting infiltration of storm water and direct contact with site waste.

Alternative #2: **Stabilization -** The new remedy achieves long-term effectiveness by reducing mobility of the constituents in the waste. Through stabilization, the leaching potential of the site contaminants, including PCBs, is reduced. The reduction in leachability will ensure that human health and ecological protective levels are not exceeded in the Brazos River.

Capping of Pond and Dike Area - As discussed for Alternative #1, capping of the pond and dike area would maintain reliable protection of human health and the environment by restricting infiltration of storm water and direct contact with site waste.

The amended remedy is expected to achieve the same level of long-term effectiveness as the original remedy. Stabilization of the site waste will prevent leaching of contaminants into the ground water at levels that would not be protective of human health and the environment in the Brazos River.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies a remedy may employ.

Alternative #1: **Biotreatment -** With destruction of the volatile waste constituents, the mobility and overall waste volume would be reduced.

Stabilization - The mobility of site contaminants in the biotreatment residue will be reduced through treatment by stabilization and lower permeability should eliminate the pathway to ground water. The volume will be increased by the amount of reagent added.

Alternative #2: **Stabilization -** A small decrease in toxicity from volatiles is expected in the full scale operation. The mobility of site contaminants will be reduced through treatment by stabilization and lower permeability should eliminate the pathway to ground water. The volume will be increased by the amount of reagent added. However, the overall material volume is very small when compared to the total volume of the lagoon which must be filled and capped.

Both the original remedy and the amended remedy reduce the toxicity, mobility, or volume through treatment of the waste.

Short-term Effectiveness

Short-term effectiveness refers to the time needed to complete the remedy and any adverse impacts on human health and the environment during implementation of the remedy.

Alternative #1: **Biotreatment -** The aqueous biotreatment step of the 1988 remedy increases the time to complete the remedial action. Also, there would be an additional waste handling step with bioremediation. Fugitive emissions during biotreatment would need to be controlled.

Stabilization - In addition to the time required for biotreatment, the biotreated residuals would have to be stabilized.

Alternative #2: **Stabilization -** The length of time for completing the remedy is reduced under this alternative. Since an in-situ stabilization process will be used, there is less material handling required and a reduced probability of worker exposure. Depending on the mixture used for stabilizing the wastes, there could be some risk to a worker during implementation. This same exposure potential is present under Alternative #1. However, worker exposure is reduced under

this alternative since the remedy is completed in a shorter time than with Alternative #1.

The short-term effectiveness is slightly improved with Alternative #2 due to the reduced material handling and shorter time to implement the remedy. Appropriate worker health and safety measures can be implemented to control potential risks to a site worker.

Implementability

Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the remedy.

Alternative #1: **Biotreatment -** The biotreatment of wastes is more difficult to implement because specialized treatment tanks will be required to accommodate the special mixing and sludge handling needs. Also, due to the power requirements to operate the biotreatment system, additional power lines would probably have to be run to the site.

Stabilization - Stabilization of the wastes is easily implemented and has been conducted at numerous Superfund sites. The equipment required to implement this portion of the remedy is not complicated and is readily available.

Alternative #2: **Stabilization -** Stabilization of the wastes is easily implemented and has been conducted at numerous Superfund sites. The equipment required to implement this portion of the remedy is not complicated and is readily available.

The equipment and personnel for both remedies are available in the remediation and construction industries. However, bioremediation requires more technical support personnel and specialized equipment. Stabilization is mechanically simple and readily adaptable to field conditions and does not require special equipment or off-site facilities. The stabilization remedy can be completed using conventional construction equipment.

Cost

Cost includes an evaluation of the capital cost and the cost of operation and maintenance of the remedy in a present worth calculation.

Alternative #1: The estimated present worth cost (in 1988 dollars) of the remedy as presented in the December 1988 ROD is $27,956,000. Based on the results from the treatability studies, the stabilization cost is reduced by $813,000 due to a

lower unit stabilization cost. In addition, the cost of the cap is reduced by $1,200,000 based on the RTRP. Also, the estimated cost for the spur jetty ($490,000) was removed from the estimate because the spur jetty was installed in 1992. The remainder of the costs presented in the 1988 ROD were determined to be within the +50 to -30 percent order-of-magnitude engineering cost estimate. Based on these revisions, the estimated cost of Alternative #1 is $24,203,000.

Alternative #2: The original estimated present worth cost for stabilization presented in the 1988 ROD was $18,466,000. Based on the results from the treatability studies, the stabilization cost is reduced by $1,100,000 due to a lower unit stabilization cost. In addition, the cost of the cap is reduced by $1,200,000 based on RTRP. Also, the estimated cost for the spur jetty ($490,000) was removed from the estimate because the spur jetty was installed in 1992. The remainder of the costs presented in the 1988 ROD were determined to be within the +50 to -30 percent order-of-magnitude engineering cost estimate. Therefore, the estimated cost of the selected remedy is $14,283,000.

Based on the above cost estimates, the amended remedy costs approximately $9,900,000 less while achieving an equivalent level of protection of human health and the environment. The primary difference in the two cost estimates is the elimination of the Biotreatment portion of the remedy and decreased stabilization unit costs and capping costs.

State Acceptance

State Acceptance indicates whether the State concurs with, opposes, or has no comment on the selected alternative.

Alternative #1: The State of Texas, through the TCEQ (formerly the Texas Natural Resource Conservation Commission) had no objection to the selected remedy.

Alternative #2: The TCEQ has been provided the opportunity to review the treatability studies, the Amended Proposed Plan, and the draft ROD Amendment. The TCEQ concurs with the amended remedy for the source control operable unit (see Appendix B for the TCEQ concurrence letter).

Community Acceptance

Community acceptance summarizes the public's general response to the alternatives described in the Proposed Plan and in the Administrative Record based on public comments received.

Alternative #1: In 1988, several comments were received supporting either incineration or stabilization as the preferred remedial alternative for the site. EPA's responses to these comments provided justification for the Agency to select biotreatment followed by stabilization and capping as the remedy for the site.

Alternative #2: Comments received during the public comment period did not oppose Alternative #2 as the preferred alternative for the source control operable unit.

Summary of Comparative Analysis

Based on the preceding comparison, EPA selects Alternative #2 as the final remedy for the Source Control Operable Unit at the Sheridan Disposal Services site. Both the 1988 ROD remedy and the amended remedy for the source control operable unit are protective of human health and the environment and comply with ARARs. Of the five balancing criteria (long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost), the criteria of short-term effectiveness and cost are the most decisive in the selection decision. The short-term effectiveness of the amended remedy is most evident in the shorter time frame for completing the treatment process, and less material handling of site wastes. The cost effectiveness of the amended remedy is a 40% reduction in the total costs compared to the 1988 ROD remedy. Therefore, Alternative #2 represents the best balance of the nine evaluation criteria found in the NCP.

SECTION 6
Statutory Determinations

Under CERCLA section 121, EPA must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedies for the source control operable unit meets these statutory requirements.

Protection of Human Health and the Environment

The amended remedy for the Source Control Operable Unit protects human health and the environment through stabilization of the contaminated sludge and soils. The stabilization process will treat the waste by immobilizing the hazardous substances present in the wastes. The matrix binding the waste together will have a high unconfined compressive strength, low permeability, and will prevent or significantly reduce further leaching of contaminants from the waste into the ground water. The utilization of a stabilization remedy will also reduce the short-term risks by reducing the material handling and the length of time to complete remediation. The placement of a cap over the entire lagoon and dike area will prevent direct contact with the treated material. Also, the cap will reduce infiltration of water thereby reducing the potential for leaching of stabilized material. Institutional controls will preclude the use of contaminated ground water and ensure the long-term integrity of the cap.

Compliance With Applicable or Relevant and Appropriate Requirements

The amended remedy for the source control operable unit will comply with all applicable or relevant and appropriate requirements ("ARARs"). Section 121(d) of CERCLA states that remedial actions must attain or exceed ARARs. ARARs are derived from both Federal and state environmental laws and include regulations, standards, criteria, or limitations not promulgated under Federal or state laws. State standards that constitute ARARs are those laws that are promulgated, substantive in nature, more stringent than Federal requirements, consistently applied and identified by the state in a timely manner. The ARARs are divided into 3 categories: 1) location-specific, 2) chemical-specific, and 3) action specific. In addition to ARARs in determining the necessary level of cleanup for protection of health or the environment, EPA may also consider non-promulgated advisories or guidance issued by Federal or state government that are not legally binding. Such materials are identified in the remedy selection process as to-be-considered ("TBC").

The selected remedy for the source control operable unit will comply with all applicable or relevant and appropriate requirements. The ARARs listed in the 1988 ROD were reviewed and identified as to whether the ARAR remains applicable or relevant and appropriate to the amended source control remedy. Also, a review was conducted to determine if there were any additional ARARs Table 6-1 summarizes the action-, chemical-, and location-specific ARARs.

Cost Effectiveness

EPA believes the amended source control remedy will eliminate the risks to human health at an estimated cost of $14,283,000. The cost of the amended source control remedy is significantly lower than the $24,203,000 estimated cost for the 1988 ROD remedy due to elimination of the biotreatment, a reduction in unit cost for stabilizing the site wastes, a reduction in the time necessary to treat the waste, and a reduction in the cost of the cover. The amended source control remedy will meet the same remedial action objectives and goals established in the 1988 ROD utilizing a more cost-effective approach.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practical

The in-situ stabilization remedy meets the statutory requirement to utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. The selected remedy treats the principal threats posed by the lagoon by immobilizing the waste contaminants to prevent or significantly reduce further leaching into the ground water. The selected remedy provides the most effective treatment method and will cost less than off-Site disposal. The amended remedy remains consistent with program expectations that principal threat wastes are a priority for treatment. EPA has determined that the amended remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence; reduction in toxicity, mobility, or volume achieved through treatment; short-term effectiveness; implementability; and cost; while also considering the statutory preference for treatment as a principal element as well as considering state and community acceptance.

Preference for Treatment as a Principal Element

The amended source control remedy satisfies EPA's preference for treatment to address the principal threat at the Site during the remedial action. The principal threat at the Site is the oily waste in the lagoon. Hazardous substances in the sludge and ancillary soil and debris are a source of long-term risk at the Site. Treatability studies of the waste material confirmed that the stabilization process can effectively reduce the mobility of the hazardous substances in the waste material. Leachate from the stabilized waste material is not expected to impact surface water above the standards set for the Site.

Five Year Review Requirements

Because the amended remedy may result in hazardous substances remaining onsite above health-based levels, a review will be conducted within five years of commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Table 6-1
Applicable or Relevant and Appropriate Requirements (ARARs)

STANDARD, REQUIREMENT, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	MEDIA	RATIONALE & DISCUSSION
LOCATION SPECIFIC				
Floodplain Management	Executive Order 11988	To the extent possible, avoid the long and short term adverse impacts associated with occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.	Soils	This order discusses actions that should be taken to reduce the risk of flood loss, minimize the impact of floods on human safety, and restoration and preservation of the natural and beneficial values served by floodplains.
ACTION SPECIFIC				
1. SURFACE IMPOUNDMENT CLOSURE				
Standards for Owners and Operators of Hazardous Waste Treatment, Storage or Disposal Facilities	40 CFR Part 264 Subpart K - Surface Impoundments	40 CFR §264.228 discusses the closure and post-closure care of surface impoundments that were used to treat, store, or dispose of hazardous waste. Closure and post-closure includes: 1) elimination of free liquids; 2) stabilization of wastes to bearing capacity sufficient to support final cover; and 3) a final cover. Post-closure includes maintaining final cover, maintaining ground water monitoring and preventing runoff.	Sludges, Soils	The remedial action will be designed and conducted to meet the closure and post-closure requirements.
2. WASTEWATER				

STANDARD, REQUIREMENT, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	MEDIA	RATIONALE & DISCUSSION
Criteria and Standards for the National Pollutant Discharge Elimination System	40 CFR Part 122 40 CRF §125.3 30 TAC Chapter 308	The National Pollutant Discharge Elimination System (NPDES) program is the national program for issuing, monitoring, and enforcing permits for direct discharges. 40 CFR Part 122 requires permits for the discharge of "pollutants" from any "point source" into "waters of the United States." 30 TAC Chapter 308 discusses the criteria and standards for the NPDES.	Wastewater and/or stormwater	Discharge of contaminated stormwater and waste-water streams into the Brazos river would need to comply with these standards. Under the Superfund Program, an on-site discharge from a CERCLA site to surface water must meet the substantive NPDES requirements, but need not obtain an NPDES permit nor comply with the administrative requirements of the permitting process.
3. AIR				
General Air Quality Rules	30 TAC Chapter 101	No person shall discharge air contaminants in such concentration or duration to be injurious to or adversely affect human health or welfare, animal life, vegetation or property.	Air	The remedial action will be designed and conducted to meet this ARAR.
4. OTHER/MISCELLANEOUS				
Standards for Generators and Transporters of Hazardous Waste	40 CFR Part 262 40 CFR Part 263	40 CFR Part 262 deals with standards for generators of hazardous waste while 40 CFR Part 263 deals with standards for transporters of hazardous waste.	Tanks, processing equipment, drum contents	These ARARs would have to be met to the extent that the remedy involves off-site transport of materials.

STANDARD, REQUIREMENT, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	MEDIA	RATIONALE & DISCUSSION
Standards for Owners and Operators of Hazardous Waste Treatment, Storage or Disposal Facilities	40 CFR Part 264 Subpart B - General Facility Standards	40 CFR §264.14 discusses the security requirements 40 CFR §264.17 discusses general requirements for ignitable, reactive, or incompatible wastes.		The remedial action will be conducted to meet these general facility standards.
	40 CFR Part 264 Subpart G - Closure and Post-Closure	40 CFR §264.114 deals with the disposal and decontamination of equipment, structures, and soils 40 CFR §264.117 considers the post-closure care and use of property.		The remedial action will be designed to meet this ARAR
CHEMICAL SPECIFIC				
1. SURFACE WATER				
Water Quality Standards **Texas Surface Water Quality Standards**	Federal Water Quality Criteria 30 TAC Chapter 307	The general criteria set forth in this chapter apply to surface water in the state and specifically apply to substances attributed to waste discharges or the activities of man. The state water quality standards are legally enforceable counterparts to the Federal water quality standards. The state standards establish certain numerical criteria which are legally applicable in the Brazos.	Wastewater/ Stormwater Groundwater	The Brazos River runs adjacent to the site and may be subject to point sources during remediation. The point source discharges will be treated prior to discharge to the Brazos, if necessary. At the completion of remediation, the Brazos may be impacted by groundwater discharge into the river from the upper unconfined sand zone. Theses standards would be ARARs to this discharge
2. SLUDGE/SOIL				

STANDARD, REQUIREMENT, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	MEDIA	RATIONALE & DISCUSSION
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions	40 CFR Part 761 Subpart G-PCB Spill Cleanup Policy	40 CFR §761.125 establishes the requirements for PCB spill cleanup.	Sludge, soil	The requirements are considered relevant and appropriate at the site. As such, the cleanup level of 25 ppm PCBs set forth in §761.125(c)(3) is the most appropriate action level for the site.

SECTION 7
Public Participation and Significant Changes

The Amended Proposed Plan for the Sheridan Disposal Services Site was mailed to the site mailing list and a copy of the Administrative Record was placed in each of the three repositories on April 8, 2002. The repositories are located at the Waller County Library in Hempstead, Texas, at the TCEQ in Austin, Texas and at the EPA Region 6 office in Dallas, Texas. An advertisement of the formal 30-day public comment period was placed in the Waller County News Citizen on April 11, 2002, and in The Hotline Press on April 10, 2002.

On April 16, 2002, the Agency held a public meeting to discuss the Amended Proposed Plan and to respond to oral comments. A transcript of this meeting and the comments along with the Agency's response to comments are included in the Administrative Record, which is a part of this Amended Record of Decision.

Starting on April 8, 2002, the Agency held a 30-day public comment period to accept public comment on the alternatives presented in the Amended Proposed Plan and on any other documents previously released to the public. No written comments were received during the public comment period.

The EPA has reviewed all verbal comments submitted during the public comment period. Upon review of these comments, the Agency has determined that no significant changes to the amended remedy identified in the Amended Proposed Plan are necessary. Comments received during the public comment period are addressed in the Responsiveness Summary (Appendix A). The State of Texas is in concurrence with the selected amended remedy.

Appendix A

Responsiveness Summary

Sheridan Disposal Services Superfund Site
Waller County, Texas
Record of Decision
Responsiveness Summary

This Responsiveness Summary is prepared from oral comments received during the public comment period for the Amended Proposed Plan. The comment period began April 8, 2002, and closed on May 7, 2002. A formal Public Meeting was held on April 16, 2002, at the Waller County Courthouse in Hempstead, Texas. A transcript of the oral comments received at the meeting was prepared. EPA did not receive any written comment letters concerning the remedial alternatives in the Amended Proposed Plan. The public meeting transcript is part of the amended Administrative Record.

Summary of Comments Received

1. Comment: Once the comment period ends, when will the cleanup begin at the site?

   Response: Before the Potentially Responsible Parties (PRPs) can begin the Remedial Design/Remedial Action (RD/RA), the 1988 Record of Decision (ROD) and Consent Decree (CD) need to be amended. The ROD will be amended approximately two months following the close of the public comment period for the Amended Proposed Plan. Amending the CD will take longer than the ROD amendment. Additional time to amend the CD is needed so that pertinent sections of the CD and the attached statement of work (SOW) can be modified. Once EPA makes the changes to the CD and the SOW, the U.S. Department of Justice (DOJ) lodges the CD with the Court on behalf of EPA. Finally, the Court has to sign the CD before the PRPs will officially begin RD/RA activities, although it is possible for the PRPs to begin the remedial design before entry of the consent decree. It is estimated that it will be approximately nine months to one year before the PRPs will start the remedy.

2. Comment: What is the projected time frame from start to completion of the project?

   Response: It is estimated that the stabilization of wastes will take approximately twelve months. Once the waste is stabilized, the lagoon will be capped. Approximately six months will be needed to cap the lagoon. Therefore, the entire project will take around eighteen months to complete.

3. Comment: An adjacent landowner was concerned that until the Sheridan Site is cleaned up, the site has a negative impact on who is interested in their property. In addition, the commentor noted that oil companies would not drill on their property. The oil companies are

concerned that fracturing during oil well completion could possibly cause a release from the impoundment thereby contaminating ground water in the area. The landowner's concern was based on the current condition of the pond, not when it is stabilized.

Response: EPA agrees with the commentor that once the wastes are stabilized and capped the site will be protective of human health and the environment. While waiting for the remedial action to be completed, interim actions have been taken to stabilize the site and prevent any releases to the environment. In 1992, the PRPs installed a spur jetty in the Brazos River to control erosion along the cut bank of the Brazos River adjacent to the site. The spur jetty has been effective in controlling erosion of the cut bank. Also, the PRPs have pumped stormwater from the lagoon to ensure that there would be no overtopping of waste from the lagoon. Regarding oil companies not wanting to drill on property adjacent to the site, EPA has insufficient information to fully determine if there would be any adverse effects to the lagoon from fracturing during completion of an oil well.

The shallow ground water at the site occurs approximately 30 feet below ground level. In an area between the lagoon and the Brazos River, the shallow ground water has low levels of site contaminants. There is no contamination present in the next deeper water zone that occurs approximately 80-100 feet below ground level. The Agency presumes that any oil development would take place considerably deeper than the ground water zone where contamination is present.

4. Comment: Once the remediation is completed, is there a certificate or something in writing that an adjacent landowner can get to show that the site is safe and stable?

Response: Once the PRPs have completed the construction of the Source Control remedial action, they will submit a "Site Remediation Report." This report will contain 1) all data collected during the site remediation, 2) a narrative describing major activities conducted and problems addressed during site remediation, 3) as-built plans and modifications of the Remedial Design, and 4) certification by a Professional Engineer that work has been completed in compliance with the terms of the Consent Decree. Once EPA approves the "Site Remediation Report," the Agency will issue a "Certification of Completion" to the PRPs. The "Certification of Completion" is issued once the Agency concludes that the remedial action has been fully performed in accordance with the Consent Decree and that the Performance Standards have been achieved.

An adjacent landowner who is concerned and wants to demonstrate that the site is safe and stable could get a copy of the Certification of Completion from EPA or the PRP group. In some situations, in order to facilitate land transfers, EPA also can issue a "comfort/status letter" to document the condition of the property and EPA's expected approach to contamination before, during, or after remedial activity has been completed.

5. Comment: The spur jetty that was installed to divert the current away from the cutbank on the Brazos river is about all deteriorated. Due to the deterioration, the river is beginning to erode the bank.

   Response: Due to erosion of the cutbank of the Brazos River adjacent to the site, the 1988 ROD required the installation of a flexible spur jetty. The spur jetty was installed in 1992 and has been effective as an erosion control system. The 1988 ROD also requires operation and maintenance (O&M) to assure that the remedy remains protective. Part of the site O&M includes inspection and repair (as necessary) of the spur jetty system in the Brazos River.

6. Comment: An adjacent landowner voiced a complaint that they should be able to sell as much dirt as possible for use in filling and capping the lagoon on the Sheridan site.

   Response: The Agency cannot dictate whom the PRPs choose to buy fill material from. However, a sampling program will be conducted to confirm that the fill material is of adequate quality for the construction of the cap and for fill material under the cap. The sampling program will evaluate the moisture content, hydraulic conductivity, Atterberg limits, and particle size distribution of potential fill material. Specific limits on the above parameters will be determined during the Remedial Design.

7. Comment: Will the waste in the pit be removed, solidified and put back in the lagoon and then capped?

   Response: The Amended ROD will require in-situ stabilization of the lagoon wastes. Before the wastes can be stabilized, the surface water will be removed, treated (as necessary) and disposed of. Once the lagoon, or a portion of the lagoon is de-watered, the wastes will be stabilized. Following stabilization of the waste, the remainder of the lagoon will be filled with soil, and the entire lagoon will then be capped.

8. Comment: You can see seepage coming from the direction of the pit. Is that the water table or is that a deeper water table?

   Response: The alluvium of the Brazos River forms the first Regional aquifer beneath the site. The Evangeline and Jasper aquifers underlie the alluvium. Most wells close to the site tap the Evangeline aquifer.

   The first water-bearing zone at the site, which occurs approximately 30 feet below ground level, is referred to as the shallow aquifer. This aquifer is part of the sediments of the Brazos River Alluvium. Ground water in the shallow aquifer generally flows toward and discharges to the Brazos River. During high river stage conditions (less than one third of the time), ground water flows away from the river. The second water-bearing zone, known as the deep aquifer, is part of the Evangeline aquifer. The deep aquifer occurs approximately 80 to 100

feet below ground surface at the site. Although EPA has not observed the seepage, it is presumed that the seepage would be from the shallow aquifer, not the deep aquifer.

9. Comment: What stabilizing mixture will be used, cement or lime?

   Response: The Agency is not specifying the final stabilization mixture to be used at the site. However, the stabilized waste will have to meet the site-specific performance standards. The performance standards will include a site-specific unconfined compressive strength and a comparison against protective leachate concentrations.

10. Comment: Will there be a leaching criteria set for the mixture that is used to stabilize the waste?

    Response: Yes. Leachate concentrations from treated wastes, as measured by the Synthetic Precipitation Leaching Procedure, will be compared to leachate levels determined to be protective of human health and the environment in the Brazos River. The protective leachate concentrations are presented in Table EA-2 of the *Evaluation of Leachate Performance Standards," July 1999*.

11. Comment: Has a final unconfined compressive strength (UCS) performance standard been set for the remedial design (RD)?

    Response: No. A final UCS will be developed during the remedial design. The stabilized material will have to be strong enough to support the final cover and the equipment to be used during remediation.

Appendix B

Concurrence Letter

Honker

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

September 19, 2002

Mr. Myron O. Knudson, P.E., Director
Superfund Division
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202

Re: Sheridan Disposal Services Federal Superfund Site, Waller County, Texas
Amended Record of Decision (ROD)

Dear Mr. Knudson:

The Texas Natural Resource Conservation Commission (TNRCC) has completed our review of the above referenced document. We concur that the remedial action for the Sheridan Disposal Services Site, described in the June 2002. Amended ROD, is the most appropriate for this site.

Sincerely,

Jeffrey A. Saitas, P.E.
Executive Director

JAS/RJW/mmw

Appendix C

Administrative Record Index